

SUMMARY OF THE INVENTION

Embodiments of the present invention provide for ringing and inter-symbol interference reduction in optical communications. In one embodiment of the present invention, the rise time of the signal is longer than the fall time of the signal. The resulting asymmetrical driver pulse is sent to the laser. The resulting overshoot, ringing, undershoot and chirp of the output from the laser are greatly reduced. As a result, the eye is approximately symmetrical and is less closed.

Approved for Release

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features, aspects and advantages of the present invention will become better understood with regard to the following description, appended claims and

5 accompanying drawings where:

Figure 1 is a block diagram of a typical optical communication system.

Figure 2 is an eye diagram of a symmetric driver pulse.

10

Figure 3 is an eye diagram of the laser output given the symmetric driver pulse of Figure 2.

Figure 4 is a graph of the chirp resulting from the driver pulse of Figure 2.

15

Figure 5 is an eye diagram of a low-pass filtered symmetric driver pulse.

Figure 6 is an eye diagram of the laser output given the symmetric driver pulse of Figure 5.

20

Figure 7A is a graph of the chirp resulting from the driver pulse of Figure 5.

Figure 7B is an eye diagram of pulse propagation over single mode optical fiber.

25 Figure 8A is a graph illustrating rise time and fall time in accordance with one embodiment of the present invention.

Figure 8B is a block diagram of pulse shaper in accordance with one embodiment of the present invention.

Figure 8C is a flow diagram of the process of shaping a driver pulse in accordance
5 with one embodiment of the present invention.

Figure 9 is a block diagram of a duty cycle distorter in accordance with one embodiment of the present invention.

10 Figure 10 is a graph of signals in a duty cycle distorter in accordance with one embodiment of the present invention.

Figure 11 is a graph of signals in a duty cycle distorter in accordance with one embodiment of the present invention.

15 Figure 12 is a block diagram of a series of duty cycle distorters configured to increase pulse width and rise time in accordance with one embodiment of the present invention.

Figure 13 is an eye diagram of the input and output signals for a summation unit in a
20 series of duty cycle distorters in accordance with one embodiment of the present invention.

Figure 14 is a block diagram of a summing amplifier with five inputs in accordance with one embodiment of the present invention.

25 Figure 15 is an eye diagram of an asymmetric driver pulse in accordance with one embodiment of the present invention.